COLLEGE OF LIBERAL ARTS & SCIENCES

The Department of

BIOLOGY

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IN THIS ISSUE

Biology Alumni Share Their Stories

Department Research Impacting Human Lives

New Programs and Initiatives

THE UNIVERSITY OF IOWA

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FRONT COVER: Many cells and tissues have a specific orientation (polarity). A signaling network, called Wnt, is critical for setting up this polarity. When manipulated in zebrafish, it leads to altered cell migration during development as well as altered neural and vascular outgrowth. The image shows Wnt activated cells (green) directing the movement of adjacent cells (red). Image provided by the Slusarski Lab. See pages 6 and 10 for information on Autumn Marsden, a current graduate student, and Xue Mei, a former graduate student, of the Slusarski Lab.

LOOKING BACK AND AHEAD TO AN OPTIMISTIC FUTURE

It is that time when I look back to what we achieved as a department in the past year. Since we recently went through our departmental review, I would like to also take this opportunity to reflect on our accomplishments during my tenure over the past six years. Without any doubt in my mind, the Department of Biology is in great shape overall given the difficult national and local situations we had to navigate through during the last six years.

What were some of the issues over the last six years? When I accepted the position as Departmental Executive Officer (DEO), I could not have possibly foreseen the largest flood in the history of Iowa City, that a recession would bring the USA and the world to the brink of economic collapse, that the National Institutes of Health (NIH) would only have a short-lived funding spike with the American Recovery and Reinvestment Act (ARRA) money followed by a lasting decline, that a new performance-based funding model adopted by the Iowa Board of Regents (but not yet approved by the state legislature) could potentially reallocate a significant percentage of state funds away from the University of Iowa (UI), and that the financial support for our graduate program would continue to decline.

Through these very testing times, the department replaced nearly one-third of our faculty and cut the average length of time for graduate students to complete a Ph.D. degree from 6.7 years to less than 6 years (we are now at 5.7 years). Additionally, our department undergraduate student enrollment is expected to be at a record number in 2015-16 with essentially the same number of tenure-track faculty we had in 2004.

This past year marked the highest extramural (outside the UI) funding support for our department, the highest citation rate of our faculty, and the largest number of student co-authored papers, to name a few of the many achievements. In 2014, the department received a record amount of bequests with nearly $3.5 million earmarked for student-related research. A new major in Biomedical Sciences that will be administered in the Department of Biology was also given approval. This very selective major will only accept top students and will provide them with a streamlined curriculum to prepare them for advanced professional training in medical-related fields. In addition, a new pilot program, called the Latham Science Engagement Initiative, will provide selected undergraduate students with training that will enhance interdisciplinary interactions in the sciences. This novel program, facilitated in the Department of Biology, is made possible through the generous gift of Bob and Sue Latham.

Given what we accomplished under difficult conditions, I am optimistic that we will continue to overcome any new challenges that we face as we move forward.

Bernd Fritzsch, Ph.D.
Departmental Executive Officer (DEO) and Professor of Biology
Director, Center on Aging & Aging Mind and Brain Initiative (AMBI)

NEW UNDERGRADUATE RESEARCH PILOT PROGRAM WILL BE HOUSED IN THE DEPARTMENT OF BIOLOGY

A $1 million gift to the University of Iowa Foundation from Robert J. and Sue B. Latham, of Cedar Rapids, Iowa, will empower selected undergraduate students to work across STEM (Science, Technology, Engineering, Mathematics) disciplines to consider ways to address global issues through scientific engagement. The new pilot program, called the Latham Science Engagement Initiative, will be housed in the University of Iowa (UI) Department of Biology in the College of Liberal Arts and Sciences. Its purpose will be to create an academic community of students and faculty mentors who share a mission to engage our community in science.

The selected students will conduct research in their respective laboratories for one full year, supported by a stipend. Throughout the year, students will receive guidance as they develop and implement a "broader impact" activity designed to engage the community in science. Students will also be challenged to work together to use scientific research and innovative thinking to confront societal challenges.

The UI alumni couple's gift was inspired by a desire to attract and retain more undergraduates in the sciences and to help increase placement rates of those students in world-class graduate programs in their disciplines. "If our gift attracts and keeps talented undergraduates in the sciences, provides them with strong support systems and research opportunities, and prepares them for placement in the best graduate programs worldwide, we will be very pleased," says Robert Latham.

Leading the initiative as Executive Director will be Bernd Fritzsch, who currently serves as Departmental Executive Officer (DEO) and Professor of Biology, and Director of the Center on Aging and the Aging Mind and Brain Initiative (AMBI). Lori Adams, who currently is Director of the Biology Honors Program and Co-Director of the Iowa Biosciences Academy, will serve as Deputy Director. An advisory committee of faculty from different science departments will assist Adams and Fritzsch with guiding the activities of the pilot program.

To learn how gifts can make a difference for faculty, staff, and students in the Department of Biology, please visit *www.givetoiowa.org/biology* or contact Sara Ring at the UI Foundation (sara-ring@uiowa.edu, 319-467-3639).

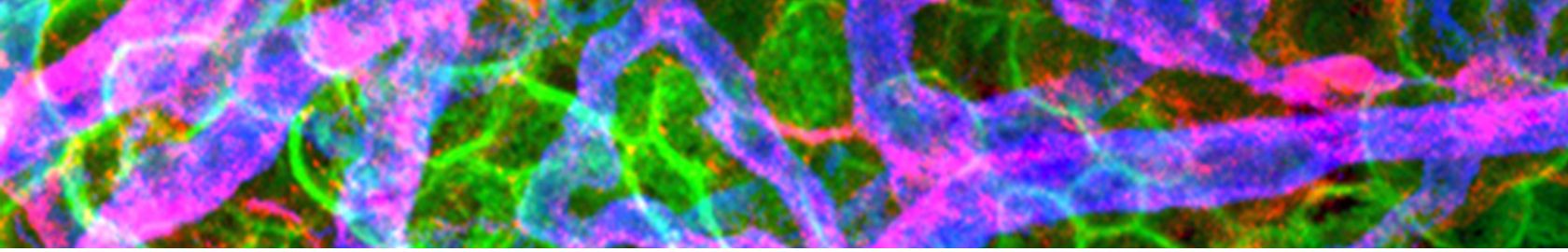
LUCK BROUGHT COUPLE TO UI

For Robert (Bob) and Carol Lynch, earning their Ph.D.'s at the University of Iowa (UI) was one of life's lucky events. Carol had been pursuing a Ph.D. at the University of Michigan, and Bob, who had taken time off to teach, was at Ohio Wesleyan University when they decided to move to Iowa in 1967 after Bob accepted a teaching position at Augustana College. "We literally got out a map and picked the University of Iowa," said Carol. Before they moved, the couple got married, and the rest, as they say, is history.

While at the UI, Carol and Bob joined Hugh Dingle's Lab. Carol also worked under the guidance of Joe Hegmann at a time when having two Ph.D. advisers was rare. Bob became interested in the effects of hibernation on the reproductive system after studying it in a graduate seminar during his first year and consulted with Edgar Folk in the physiology department, who was an expert in the field. "The faculty were not only excellent academically but very supportive of the graduate students," Carol said. "Neither of us would have had the success in our careers without the mentoring we received from the faculty."

Carol completed her Ph.D. in the fall of 1971, and Bob graduated the next spring. She is Dean Emerita at the University of Colorado Boulder, where she served as Dean of the Graduate School and Vice Chancellor for Research from 1992 to 2004. Bob is Professor Emeritus in Integrative Physiology at CU Boulder. He also taught undergraduate and graduate courses at the University of Maine and Wesleyan University in Connecticut. Carol adds, "We owe our careers to the University of Iowa," and they are honoring that with a bequest to the Integrated Biology (iBio) Graduate Program in honor of their advisers, Hugh Dingle and Joe Hegmann.

For more information about the Lynch's, please visit *biology.uiowa.edu/alumni/spotlights*



BIOLOGY PROFESSORS' RESEARCH INVESTIGATES WHY AND HOW RECOMBINATION RATES CHANGE

The fruit fly, *Drosophila,* is leading the way as a model organism in the study of the molecular mechanisms underlying changes in recombination rates and why recombination is beneficial to species. Image provided by André Karwath.

Josep Comeron, Associate Professor of Biology, and **Ana Llopart**, Assistant Professor of Biology, have received a four-year, $831,000 grant from the National Science Foundation (NSF). The project will be the first of its kind to investigate the molecular causes and evolutionary consequences of variation in recombination rates among individuals and across genomes.

The studies proposed by Comeron and Llopart will take full advantage of the unparalleled genetic and genomic tools available in the *Drosophila* model organism to study a direct link between selection, environmental conditions, and rates of recombination. The research aims to provide a new paradigm within models of adaptation based on a molecular explanation for increased recombination under stressful conditions, the very same circumstances where recombination may be most favorable. In addition, their research will investigate recombination control as a 'speciation' trait for the first time.

The Comeron Lab studies evolution at the molecular level, focusing on selection and recombination as fundamental parameters in the evolution of genes and genomes. Recent research in the lab generated the first ultra-dense recombination map in *Drosophila melanogaster* (common fruit fly) and showed that variation in recombination across the genome is the strongest predictor of genetic variation.

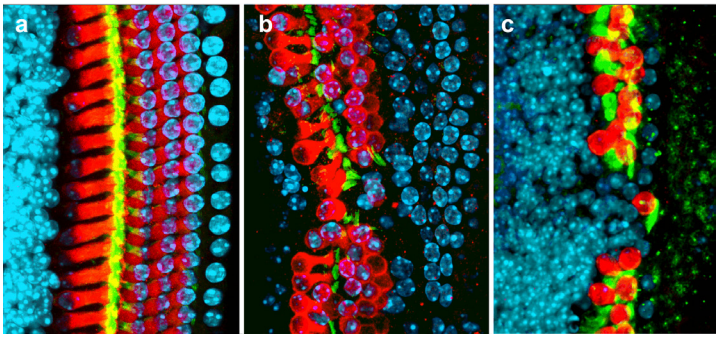
The Llopart Lab studies the process of speciation and the molecular causes of hybrid dysfunction by combining classic genetics and modern genomic techniques. Recently, the Llopart Lab has demonstrated that genes located on the *X* chromosome evolve faster than autosomal genes at both protein and gene expression levels, which could explain the special role of sex chromosomes in speciation. These studies are providing new insights into the genes and molecular mechanisms underlying species formation.

For more information about Dr. Comeron's and Dr. Llopart's research, please visit *biology.uiowa.edu/people/faculty*

BIOLOGY RESEARCHER TUNES INTO HEARING LOSS

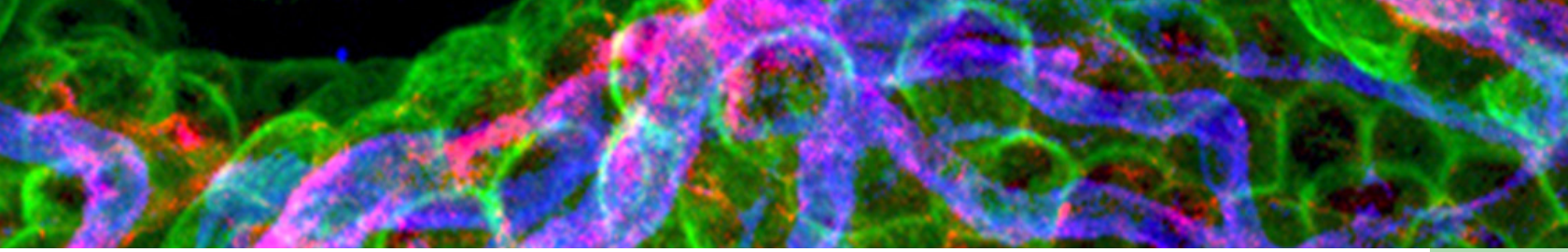
The loss or damage of hair cells in the inner ear's organ of Corti results in permanent hearing loss in humans. Using a mouse model, **Israt Jahan**, an Associate Research Scientist in the Fritzsch Lab, is studying the molecular codes necessary to reconstruct a functional organ of Corti to restore lost hearing in humans.

Jahan is currently focused on three transcription factors (Atoh1, Neurod1, Neurog1), and their interactive roles in hair cell formation. Atoh1 is essential for the development of hair cells, and Neurog1 and Neurod1 are neuronal specific genes that are also involved in hair cell formation by interacting with Atoh1. Jahan's previous work discovered that the absence of Neurod1 converts some neurons into hair cells by altering Atoh1 expression. However, her research also showed that replacing Atoh1 with Neurog1 cannot change a hair cell into a neuron. Interestingly, Jahan has demonstrated that Neurog1 can serve as a partial substitute for Atoh1 if Atoh1 is at least transiently present, resulting in the formation and maintenance of hair cells (image b) that are nearly comparable to a normal organ of Corti (image a) and in contrast to the massive loss of hair cells in the organ of Corti without Neurog1 substitution (image c). Her study provides insights into the gene interaction for long-term hair cell viability.



This image shows the organ of Corti in three different mice. Image descriptions are provided in the article. Hair cells are in red.

Jahan plans to expand her research to examine the innervation patterns of the organ of Corti to dissect their dependence on two different types, inner and outer hair cells. Jahan's research is funded by a three-year, $453,000 grant from the National Institute of Deafness and Other Communication Disorders (NIDCD) at the National Institutes of Health (NIH).



SEEKING PROTECTION AGAINST AGE-RELATED DISEASES

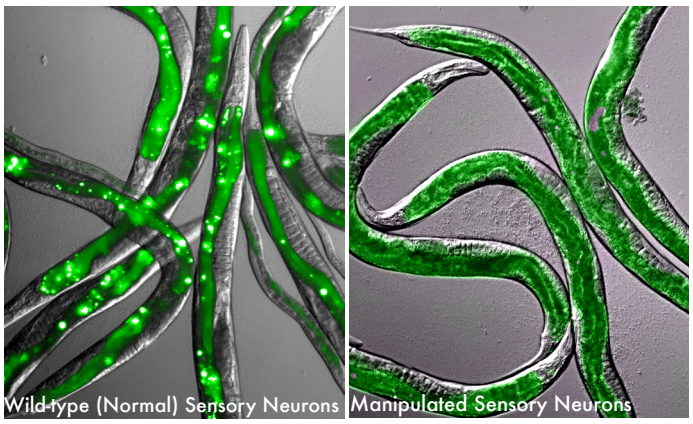
WU LAB

Studying the biological basis of aging is an area of active research in the Department of Biology. **Chun-Fang Wu**, Professor of Biology, has received a two-year, $414,000 grant from the National Institutes of Health (NIH) for his lab's research into aging and the importance of social interactions in protecting against neurodegenerative diseases using the common fruit fly, *Drosophila melanogaster*, to uncover novel neuroprotective mechanisms.

Wu's Lab has focused on mutant flies of the gene, *Cu/Zn Superoxide Dismutase* (*SOD*), which are more vulnerable to cellular oxidative stress and age-related damage to proteins, lipids, and DNA. Mutations of this gene are associated with Lou Gehrig's disease (Amyotrophic Lateral Sclerosis, or ALS) in humans. *SOD* mutant flies display an unusually short lifespan, living about 10 days compared to the normal lifespan of 60 days. Wu's Lab found that co-housing *SOD* mutant flies with healthy, young "helper" flies dramatically doubled the lifespan of *SOD* mutants and improved their stress resistance and motor coordination.

Wu and his associates will investigate the nature of the behavioral and social interactions that confer the beneficial effects. Using several automated activity tracking methods, including the video IowaFLI Tracker system they developed, the researchers will determine the critical social interactions among *SOD* and "helper" flies. To unravel a network of interacting genes centering around *SOD*, they will genetically manipulate identified neurons and neural circuits in *SOD* and "helper" flies. The Wu Lab aims to reveal the physiological basis responsible for promoting motor coordination and stress resistance as well as homeostatic improvement of longevity.

PRAHLAD LAB



The Prahlad Lab studies how the nervous system controls the aggregation of proteins, such as polyglutamine-containing protein (green) in the intestine of *C. elegans* (roundworm).

Aging results in a decline in the integrity and function of cells and tissues and is often accompanied by diseases of protein aggregation such as ALS, Alzheimer's, Parkinson's, and Huntington's diseases for which there are currently no interventions to reduce cell dysfunction and death.

Normally, activating a cell's protective responses to protein buildup reduces disease toxicity. However, in many cases in patients suffering from age-related neurodegenerative diseases, cells fail to activate these protective stress responses. Research by **Veena Prahlad**, an Assistant Professor of Biology, seeks to determine how sensory neurons protect other cells from the accumulation of proteins commonly seen in age-related neurodegenerative diseases.

Using the genetic model organism *Caenorhabditis elegans* (*C.elegans*, roundworm), the Prahlad Lab will study how and why a cell's fundamental protection against protein aggregation is under centralized control within an organism. The use of *C. elegans* allows Prahlad to employ optical methods to excite neurons of interest and observe in live animals the activation of the protective cellular response in another cell.

Prahlad, whose general interest is in understanding how such highly conserved protective responses to protein damage are controlled within a multicellular organism, has previously used *C. elegans* to demonstrate that the animals' thermosensory neurons can control protective responses of other cells, suppressing the misfolding and aggregation of disease-related proteins in those cells. Many of the neuronal mechanisms the lab is identifying in *C. elegans* are conserved in humans. Because of this, Prahlad hopes her research may uncover novel avenues to protect against diseases, such as Alzheimer's and Parkinson's by modulating neurotransmission and/or neurosecretion. This research project is being funded by a four-year, $400,000 New Scholar in Aging grant from the Ellison Medical Foundation.

To learn more about the research of Drs. Prahlad and Wu, please visit *biology.uiowa.edu/people/faculty*

WHAT'S NEW?

HAWKEYES AT THE MICROSCOPE

The University of Iowa (UI) Department of Biology participates in outreach events that benefit a wide range of audiences including K-12 students, graduate and undergraduate students at the UI, members of the area communities, and state legislators with the goal of increasing awareness and interest in biological research.

Several of the department's faculty, staff, and students are involved in educating the targeted audiences about the importance of research through various events and activities including participating in radio broadcasts and public seminars, managing tables at science festivals and fairs, and providing tours of the Biology facilities and laboratories.

"Hawkeyes at the Microscope" is a traveling science outreach exhibit developed and led by Dr. Lori Adams, Steve Kehoe, and graduate and undergraduate student volunteers in the Department of Biology. The "Hawkeyes at the Microscope" exhibit has reached hundreds of people as it has traveled to several "family science nights" at area elementary schools, the Iowa State Fair, and the annual Hawkeye Caucus Day held at the Iowa State Capitol aimed at informing state legislators how the UI impacts the state.

The specific goal of the traveling exhibit is to educate the audiences on the important role model organisms play in biological research. The exhibit features a microscope with a camera connected to a video monitor capable of viewing various model organisms such as live *C. elegans* (roundworm) and *Drosophila melanogaster* (common fruit fly). The exhibit also includes junior microscopes suitable for children to view slides of insects and spiders and other activities to learn about science in a fun and creative way. A poster and binder are displayed to show how model organisms are used by scientists in the Department of Biology to better understand human disease and answer basic science questions, such as how cells divide and become different from one another or how new species arise through evolution.

Funding to purchase equipment and supplies for the "Hawkeyes at the Microscope" traveling exhibit is provided by the UI Office of the Executive Vice President & Provost in support of one of the "pillars" of the university's strategic plan, "Better Futures for Iowans," an initiative to enhance outreach and engagement activities.

For more information about the Department of Biology's Outreach Program, please visit *biology.uiowa.edu/outreach*

NEW BIOMEDICAL SCIENCES DEGREE

A new major at the University of Iowa (UI) was recently approved. The Bachelor of Science degree in Biomedical Sciences, administered by the Department of Biology, combines coursework in chemistry/biochemistry, physics, biology/microbiology, and psychology. The curriculum of the major is designed to provide a broad foundation throughout the sciences for students interested in pursuing a career in medical practice and/or research. Entry into the Biomedical Sciences major is selective and based on demonstrated aptitude in the sciences and a commitment toward continued medical studies.

Part of the motivation for the development of a new degree program at the UI is the introduction in 2015 of a newly revised Medical College Admission Test (MCAT). Undergraduates take the MCAT usually in their junior year as part of the admissions process for medical school. The revised test format assesses three subject areas — Biological and Biochemical Foundations of Living Systems; Chemical and Physical Foundations of Biological Systems; and Psychological, Social, and Biological Foundations of Behavior along with a section that assesses Critical Analysis and Reasoning Skills. Coursework in the major combined with the expectation that students complete an Honors research project will provide the breadth and depth of knowledge assessed by the new exam. Students entering the UI and interested in pursuing the Biomedical Sciences degree can apply for admission into the program for the Fall 2015 semester.

STUDENT AMBASSADORS

The Department of Biology is participating in a new student ambassador initiative created by the College of Liberal Arts and Sciences (CLAS) to aid in undergraduate student recruitment. The ambassadors assist in the recruitment process in any way possible, including sharing their story of how they ended up at the University of Iowa (UI), giving tours of Department of Biology facilities, and assisting in recruiting events such as Hawkeye Visit Days and You@UI reaching hundreds of prospective students and families each year.

"This is a great group of current Iowa students who have done amazing things inside and outside of the classroom," says Liz Tjaden, CLAS Associate Director of Student Recruitment. "By sharing these experiences with prospective students and their families, it allows future Hawkeyes to really see themselves being successful here and confirms that Iowa is a good fit for them."

The inaugural group of Biology student ambassadors are juniors Bisola Omoba and Isaac Weinberg, and seniors Brian Brookhart and Cindy Xu. The ambassadors have found the experience beneficial to their professional development as they learn what it's like to work closely with staff and faculty in a setting not strictly defined by the classroom or laboratory. "Through this experience I hope to not only help recruit students to the Department of Biology but to also build my own interpersonal skills by going out of my comfort zone and giving tours, talking to and answering questions for prospective students," Weinberg says.

After prospective students finish speaking with a faculty or staff member about undergraduate studies, student ambassadors give the student(s) and guest(s) a tour of the Biology facilities. On these tours, prospective students receive the undergraduate perspective on studies and learn about research opportunities available to them as they tour one of the department's faculty research laboratories. Prospective students and families have been very impressed with the department tours and information presented to them, and many have commented that no other institution gave them the personal attention they received while visiting the UI.

Xu hopes her love for Biology will be contagious. She says, "I am beyond confident that Biology is the major for me and really hope that my passion for it comes through to other students with the same goals and ambitions to succeed."

Any prospective student interested in attending the UI and majoring in Biology is encouraged to contact the student ambassadors via email (admissions-biology@uiowa.edu) or phone (319-335-1050).

FUNDING ACTIVITY

(JULY 1, 2013 - JUNE 30, 2014)

Michael Dailey, Associate Professor of Biology, received a one-year grant from the University of Iowa Office of the Vice President for Research and Economic Development to study the mechanisms of microglial cell vulnerability to stroke in genetically modified mice. This is a collaborative project with Dr. Anil Chauhan, Internal Medicine, in the University of Iowa Carver College of Medicine.

Daniel Eberl, Professor of Biology, received a subaward from Northeastern Ohio Medical University for work on the National Institutes of Health (NIH) grant, "Development of a Drug Therapy to Ameliorate Permanent Hearing Loss." Principal Investigator on this grant is Dr. Jianxin Bao, Department of Otolaryngology – Head and Neck Surgery, Washington University School of Medicine in St. Louis.

The National Science Foundation (NSF) awarded a supplement to **Andrew Forbes, Assistant Professor of Biology**, for his research project, "Does Sequential Speciation Amplify Biodiversity Across Tropic Levels?"

Stephen Hendrix, Professor of Biology, received funding from the University of New Brunswick for his Goldenrod Gallmaker Impact project.

The National Institutes of Health (NIH) awarded a supplement to **John Manak, Associate Professor of Biology**, for his research project, "Genomic Identification of Copy Number Variants to Identify Clefting Loci."

Autumn Marsden (Slusarski Lab), a graduate student in the Interdisciplinary Ph.D. Program in Genetics, received a two-year fellowship from the American Heart Association.

The National Science Foundation (NSF) awarded a supplement to **Maurine Neiman, Associate Professor of Biology**, for her research on "Genomic Consequences of Asexuality."

The Holden Comprehensive Cancer Center at the University of Iowa Hospitals and Clinics awarded a Promise Grant to **Christopher Stipp, Associate Professor of Biology**, and Lori Wallrath, Professor of Biochemistry, for their research on breast cancer metastasis.

**See pages 3-4 for additional awarded grants.

RAY GAVIN

Ray Gavin knows that one often requires the help of others to improve bleak circumstances. A Ph.D. student at the University of Iowa (UI) from 1962 to 1968, he found this support with his adviser, Dr. Joe Frankel, who retired in 2013 after serving over 50 years in the Department of Biology. "Joe Frankel was indeed a supportive and nurturing mentor and a good friend through some very dark days because life in Iowa City for an African-American student was far less than ideal in 1962," says Gavin. "With Dr. Frankel's continuing support I stayed the course, graduated, and enjoyed a successful career in academia."

Gavin first considered the UI after meeting Dr. James Case while taking an Invertebrate Zoology course at the Marine Biological Laboratory in Woods Hole, Massachusetts. Case invited Gavin to study with him but moved to UC Santa Barbara before Gavin completed his studies at Howard University. Still, knowing that the UI "was at the forefront of equal opportunity long before it became a government action," Gavin applied and became Frankel's first graduate student, working with *Tetrahymena thermophila*, a single-celled freshwater organism used as a model for molecular research.

After graduating with a Ph.D. in Zoology in 1968, Gavin was a Postdoctoral Fellow at the University of Wisconsin. In 1971, he accepted a position at Brooklyn College where he remained for 43 years until he retired in September 2014. During his time there, he achieved the rank of professor, published several articles, edited two books, received NSF research grants, and served as the Department of Biology chairman for 17 years. Gavin considers one of his greatest accomplishments to be his mentorship of more than 90 undergraduates, many from groups underrepresented in science and from disadvantaged backgrounds and says, "we are life-long friends."

JOHN RENGER

John Renger was a pre-medical student with aspirations to become a practicing physician when a meeting with Professor of Biology, Chun-Fang Wu, changed the course of his career forever.

Renger, originally from Ledyard, Iowa, was the first in his family to attend college. He studied in the department as both an undergrad and a graduate student, completing his bachelor's in 1991 and his Ph.D. in 1997. After taking a course in neuropsychopharmacology, Renger wanted to start an undergraduate research project and approached Wu.

"That single meeting ultimately led me to rethink my career path from clinical practice to preclinical basic research," said Renger, who worked with Wu from 1989 to 1997. "I spent the last two years of undergrad and 6 years of graduate school learning how to be the best scientist I could be with Dr. Wu's help. I carry those experiences with me everywhere and use the tools he taught me every day in my own labs, even through today."

Renger went on to complete postdoctoral work in Japan and at the Massachusetts Institute of Technology (MIT). Since 2001, he has worked for Merck, where he currently leads drug discovery programs in neuroscience. His research has led to the approval of Belsomra, a novel drug treatment for insomnia. In addition, his work has been a topic of multiple popular press articles, including "The Big Sleep" featured in *The New Yorker.* He also serves as a member of the Aging Mind and Brain Initiative (AMBI) External Advisory Board at the University of Iowa (UI).

Renger credits the UI with his happy marriage to Dr. Xin Mu-Renger, D.D.S., who graduated from the College of Dentistry in 1999. Renger, his wife, and his two brothers hold a combined total of 6 UI degrees. He speculates that his two daughters, 10-year-old Abbigail, and 6-year-old Amanda, may also be future Hawkeyes.

For more information about Ray Gavin, John Renger, Ryan Ries, Carrie Stoltzman, and other Biology alumni, please visit *biology.uiowa.edu/alumni/spotlights*

RYAN RIES

An untraditional path brought Ryan Ries to the University of Iowa (UI), so it's no surprise that his experience here was unusual. Ries, from Sergeant Bluff, Iowa, worked in a variety of jobs, from loading packages to editing a magazine, while completing his associate degree. When Ries started his bachelor's degree in 2011, he chose Iowa because he felt it was the best public university in the state, he enjoyed Iowa City, and he would be able to study biology and linguistics at the same time.

During his three years at Iowa, Ries was consistently on the Dean's List and worked in Professor Bernd Fritzsch's Lab. He volunteered with Project HOPE and the Jacobson Institute for Youth Entrepreneurship at the UI and co-founded and became president of a software start-up, TranslaCare.

TranslaCare's software product, Iconotouch, is a web-based service that is designed to facilitate communication for individuals in hospitals or nursing facilities who have speech and/or language deficits that prevent them from engaging in verbal communication with caregivers or family members. TranslaCare has received several awards including a $100,000 loan via the Iowa Innovation Acceleration Fund.

Ries has focused on managing the business operations of TranslaCare since graduating from the UI in Spring 2014. He feels his unusual path has given him time to figure out what he wants to do.

"I think that time (from his curiosity at a young age to his undergraduate research and work with TranslaCare) was essential for me in figuring out how I could pursue curiosity in a professional career," Ries said. "I also realized that I could pursue curiosity not just for its own sake, but I could do it through a medical and/or scientific career in which I can make a positive impact on people's lives."

CARRIE STOLTZMAN

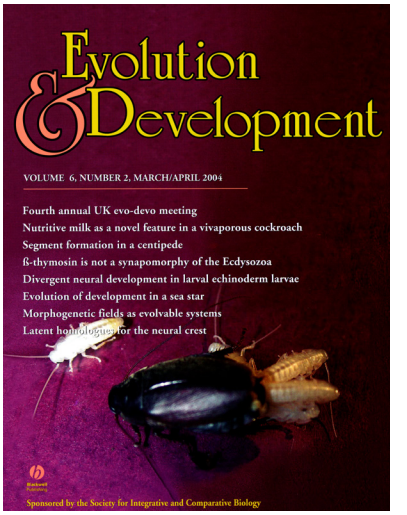
For Carrie Stoltzman, life at the University of Iowa (UI) was all about balance. "For me, the university and the city together was a 'just-right' place," she says. "Not too big but not too small, quiet enough to focus on your studies but connected enough to explore the fine arts, performances, and ped mall events."

Stoltzman, originally from Howards Grove, Wisconsin, graduated from Gustavus Adolphus College in May 1990 and started work on her Ph.D. at the UI a few months later. "I chose the Department of Biology at the University of Iowa because…the graduate program placed great emphasis on students' understanding of a broad range of biological topics. I knew I would get a full, well-rounded educational experience," said Stoltzman.

Stoltzman worked in Barbara Stay's Lab, studying cockroaches. Stoltzman saw Stay as a role model for life at and away from the lab bench. "As a mentor, she was a wonderful example of how to be scientifically inquisitive, to set and maintain high quality standards in work and in life, to balance work with play, to enjoy the work you choose to do, and to make time for morning tea," Stoltzman said, adding that Joe Frankel, Gene Spaziani, and John Stefaniak were also important mentors.

After graduating in 1998 from the UI with a Ph.D. in Biological Sciences, Stoltzman worked as a postdoctoral fellow at the University of Utah, studying mammalian counterparts of *Drosophila* tumor suppressor genes in mouse ovarian surface epithelium. After this, she worked as a laboratory specialist at the Huntsman Cancer Institute in Salt Lake City for eight years before moving on to the University of Washington and Groove Biopharma in Seattle. Although she's currently between scientific positions, Stoltzman enjoys volunteering at the Seattle Aquarium, educating visitors about the local marine environment.

AN UNEXPECTED PATH OF RESEARCH



Professor Emerita Barbara Stay's efforts to unlock the secrets of the regulation of reproduction in insects have resulted in partnerships across the globe.

Stay, who taught in the Department of Biology from 1967 to 2010, studied a viviparous cockroach that produces a protein-rich milk to nourish its young during gestation. In 1997 while meeting with then-Genomics candidate, Debashish Bhattacharya, who taught in the department from 1997 to 2009, Stay learned of genes that served one function in bees and a different function in flies. "That made me wonder whether we could find the cockroach milk gene and whether a similar gene provided for a different function in other cockroaches," she said.

In 2001, Anna Williford, a senior Biology major, worked with Stay and Bhattacharya to find the cockroach milk gene. Her success, showing that the closest similar gene was coded for a sex attractant in a different cockroach, resulted in Anna's master's degree and an excellent publication with a picture of a cockroach giving birth on the cover of *Evolution & Development* (see photo).

Later, Stay learned from Nathan Coussens and his Biochemistry Ph.D. adviser, Professor Ramaswamy, who worked on the crystal structure of proteins, that proteins rarely form crystals in nature. Yet Stay knew that milk protein crystals formed in the embryonic gut of the viviparous cockroach, so she supplied crystals for them to study. They worked to determine the crystal structure, but the last step proved elusive. Coussens graduated with another project, Stay retired to Boston, and Ramaswamy relocated to India.

In 2013, Ramaswamy emailed Stay with a request to send crystals to researchers in Tsukuba, Japan, who had access to sophisticated equipment. To obtain the crystals, Stay traveled to the laboratory of colleague, Professor Stephen Tobe, at the University of Toronto to show Dr. Koichiro Yagi how to extract the crystals. Yagi sent crystals to Japan and India. Using the genetic information from Williford, the collaborative effort of Drs. Ramaswamy, Coussens, Leonard Chavas, and Francois-Xavier Gallat solved, at high resolution, the final step in the crystal structure. A manuscript is currently in review.

THE DEVELOPMENTAL STUDIES HYBRIDOMA BANK CONTINUES TO SUPPORT BIOLOGY GRADUATE STUDENTS

Under the direction of David Soll, Professor of Biology, the Developmental Studies Hybridoma Bank (DSHB) is contributing $100,000 this year to the Department of Biology for four graduate student fellowships beginning in the Spring 2015 semester. The new fellowship recipients, announced at the Graduate Program Student Retreat, are Ben Alleva in the Sarit Smolikove Lab, Kar Men Mah in the Joshua Weiner Lab, Josh Thompson in the Bryan Phillips Lab, and Denise Oh in the Doug Houston Lab. The students will work with Dr. Karla Daniels, Brian Berger, and Rebecca Glover in the production of monoclonal antibodies related to their research.

The DSHB again funded the Integrated Biology (iBio) Graduate Program Student Retreat held September 27, 2014, at the Radisson Quad City Plaza in Davenport, Iowa. At the retreat it was announced that the DSHB would provide to department members, at no charge, select supernatants from the National Cancer Institute's Office of Cancer Clinical Proteomics Research and from the National Institutes of Health (NIH) Common Fund Protein Capture Reagents Program collections in return for characterization information.

The DSHB, a national resource created by NIH, is housed in the Department of Biology at the University of Iowa. The DSHB also funds research in the Monoclonal Antibody Research Institute (MARI), which is also facilitated in the Department of Biology. This year MARI scientists published papers on Huntington's disease and the tumor suppressor gene, PTEN. This tumor-fighting gene was featured in an article and interview with Dr. Soll on *Iowa Now* (now.uiowa.edu) titled, "Treating cancer: UI biologists find gene that could stop tumors in their tracks." For more information about the DSHB, please visit *dshb.biology.uiowa.edu*

GRADUATES

Doctor of Philosphy (Ph.D.) in Biology

Fall 2013

Benjamin Kopecky (Fritzsch Lab)
Thesis Title: "The Roles of N-Myc and L-Myc on Inner Ear Neurosensory Development"
Elizabeth Savelkoul (Logsdon Lab)
Thesis Title: "Molecular Evolution of Meiosis Genes in Fungi"
Karen Elliott Thompson (Fritzsch Lab)
Thesis Title: "Ear Manipulations Help Model Neuroplasticity Limitations"
Tian Yang (Fritzsch Lab)
Thesis Title: "A Prickly Situation: PRICKLE1 Function Depends on the Signaling Context"

Spring 2014

Erin Bailey (Green Lab)
Thesis Title: "Why Do Spiral Ganglion Neurons Die After Deafening?"
Xue Mei (Slusarski Lab)
Thesis Title: "Wnt/Planar Cell Polarity Mechanisms in Epilepsy and Interactions with Ciliopathy"

Summer 2014

Linh Bui (Cheng Lab)
Thesis Title: "Molecular Dissection of Asexual Reproduction in the Model Fern *Ceratopteris richardii*"

Bachelor of Science in Biology with Honors

Fall 2013

Alaine Hippee (Forbes Lab)

Spring 2014

William Campbell (Forbes Lab)
Joseph Drum (Logsdon Lab)
Daniel Grigsby (Slusarski Lab)
Matthew Knoedel (Phillips Lab)
Norah Koblesky (Weiner Lab)
Dillan Newbold (Weiner Lab)
Caitlin Reid (Stipp Lab)
Ryan Ries (Fritzsch Lab)
Christopher Sande (Dailey Lab)
Michelle Sullivan (Neiman Lab)

Summer 2014

Daniel (Alex) Alder (Hendrix Lab)

Bachelor of Arts in Biology with Honors

Spring 2014

Jonathan Birdsall (Manak Lab)
Jason Haselhuhn (Fassler Lab)
Aaron Schill (Lear Lab)
Chance Sullivan (Phillips Lab)
Rebecca Walters (Lear Lab)

IN REMEMBRANCE

Ammann, Dr. G. A.	B.A. Zoology, 1933; M.S. Zoology, 1933 (May 22, 2008)
Elliott, Dr. Eugene W.	M.S. Botany, 1947; Ph.D. Botany, 1948 (January 30, 2014)
Farr (Ehrmann), Dr. Marie L.	Ph.D. Botany, 1957 (May 13, 2014)
Fribourgh, Dr. James H.	M.S. Zoology, 1949 (March 6, 2014)
Frommelt, Alton A., D.D.S.	B.A. Zoology, 1953 (December 4, 2013)
Gabaldon, Dominic D.	B.A. Biology, 2007 (March 7, 2014)
Heist, Dr. Herbert E.	M.S. Zoology, 1951; Ph.D. Zoology, 1957 (February 27, 2014)
Hovey, Todd C.	B.S. Biology, 1988 (December 18, 2013)
Johnson, Don T.	B.A. Botany, 1950 (August 21, 2013)
Poore, Harold K.	B.A. Zoology, 1950 (March 17, 2014)
Rickey, Marlin D.	M.S. Botany, 1964 (March 26, 2014)
Spohnheimer, Victor J.	M.S. Botany, 1942 (September 20, 2010)
Thompson, Stacy L., M.D.	B.S. Biology, 1992 (April 11, 2014)
Unzicker (Carman), Carolyn F.	M.S. Botany, 1956 (June 13, 2010)

*Birth name (if applicable) and deceased date are listed in parentheses.
Reference: UI Division of Alumni Records

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PHOTO ON THE RIGHT: Metastatic human melanoma express the cytoskeletal protein vimentin (in orange) as visualized by immunostaining using the AMF-17b monoclonal antibody distributed by the Developmental Studies Hybridoma Bank (DSHB). Image provided by the Soll Lab.